

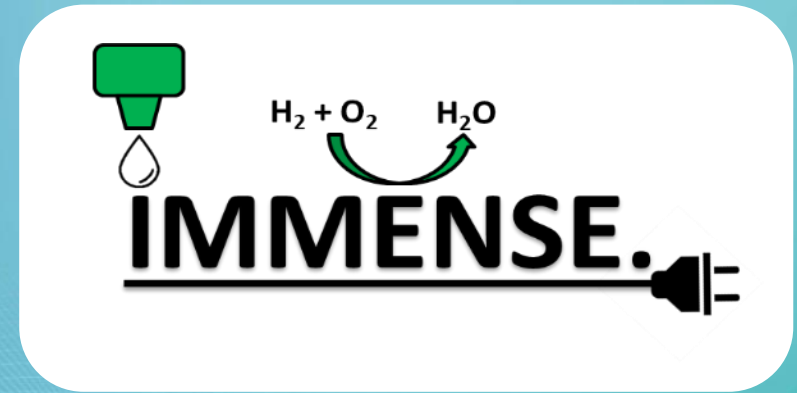
IMMENSE

Inkjet manufacturing of CCMs for PEMFC
by development of catalytic inks
& their deposition

Call topic: Functional materials

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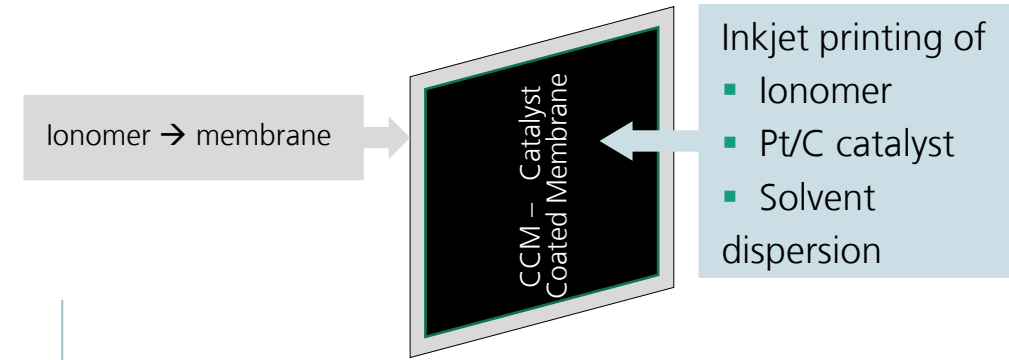
Objectives of IMMENSE

Field of activity:

Production of Catalyst Coated Membranes (CCMs) for the application in low temperature Polymer-Electrolyte-Membrane (PEM) Fuel Cells (FC) (PEMFC) by employing **inkjet printing** technology for **newly developed materials**

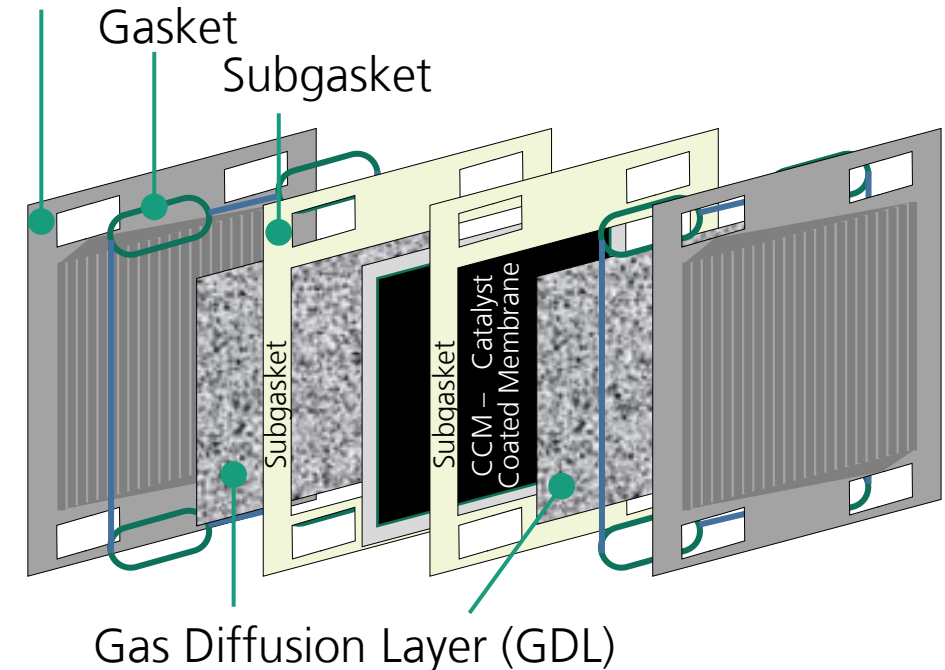
Objectives

1. Inkjet-ink preparation and inkjet printing process
2. Flexibility in design with new material system
3. Advanced mathematical modelling of stack
4. Short stack fuel cell demonstrator



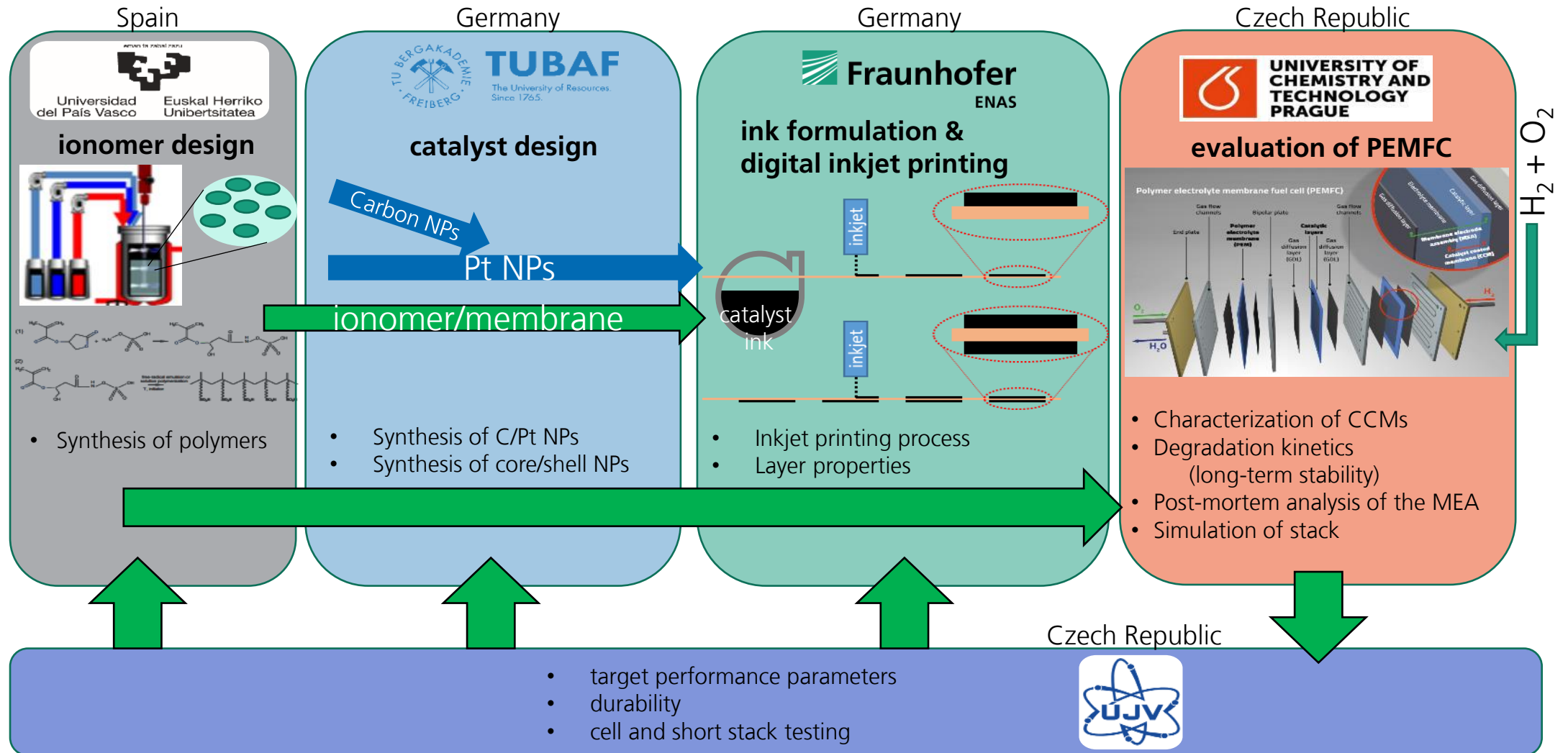
1 cell of PEMFC stack

Bipolar Plate (BPP)



Partners of IMMENSE

Process workflow



Top 3 findings of IMMENSE

Take home message

Inkjet-printed catalyst layers on PEM employing bio-based ionomers and microwave synthesized catalysts are functional and pave the way for affordable and sustainable energy (SDG 7) and innovative industrial processes (SDG 9)

- **Inkjet-printed CCMs perform better than state-of-the art ultrasonic sprayed ones at significantly lower Pt loading >> Project results meet industrial target performance parameters**
- **Newly developed materials show performance comparable to commercial ones**
 - Synthesized bio-based ionomers present good and temperature stable ionic conductivity
 - Microwave synthesis of Pt/C catalysts are basis for core shell catalyst development
- **Simulation of catalyst distribution generates better understanding for processes**

Thank you for your kind attention



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